

REMARKS/ARGUMENTS

The Amendment

By the present amendment, the claims have been amended to more particularly define the inventive subject matter and to clearly distinguish same over any teaching or suggestion of the applied references. Claims 6 and 19 have been amended to improve their form. Claim 19 has also been amended with respect to its dependency.

Apparatus Claims 22, et seq.

In the Office Action of September 26, 2006, independent apparatus claim 22, and certain claims dependent thereon, were rejected under 35 U.S.C. §102 as anticipated by U.S. Patent 3,929,003 to Llewellyn.

The subject matter recited in amended independent apparatus claim 22 differs from the detector in the Llewellyn reference in both purpose and construction. As noted at page 3, lines 31-34 and elsewhere in the application specification, the purpose of the present invention is to optimize gas throughput and minimize response times when carrying out separation on a sample gas stream having a deleterious substance, such as moisture, entrained therein. The Llewellyn reference is directed to extracting trace gases from the waters of streams, rivers, lakes, and oceans. The Llewellyn reference is devoid of any discussion of the considerations that are important to, and the objects that are achieved by, the claimed invention.

With respect to construction, claim 22 has been amended to note that the tapering of the output passage takes place in the region in which the output and input passages are on opposite sides of a separating wall. This clearly distinguishes the claimed subject matter over the showing of the tapering of an adapter in the output of the Llewellyn detector necessary to accommodate the vacuum pump (8) noted in paragraph 4 of the Office Action.

Independent apparatus claim 22 thus describes subject matter that is neither anticipated or obvious in view of the disclosure of the Llewellyn reference. Withdrawal of the rejection of the claim is respectfully requested.

Examined claims 2-4, 6, 8, 17, and 18, and added claim 27, depend directly or indirectly on claim 22, are not anticipated for the reasons set out, above, in the argument for allowance of claim 22. The claims are also deemed allowable for the detailed subject matter

recited therein. For example, claim 2 calls for the tapered portion of the output passage to extend over at least about half of the output passage length in the region in which the passages lie on opposite sides of the separating wall. This is clearly not true of any taper shown in the Llewellyn reference. Similarly, claim 8 calls for the tapering angle to be between 30° and 0.5°. The convergence/divergence shown in the Llewellyn reference appears to be well outside that range, for example, 45°. Claim 27 is directed to a configuration of the passages that provides similar gas profiles in the passages, which configuration is not found in the Llewellyn reference.

Independent apparatus claim 22 and claims 2-5, 7-9, 17-21 and 23 dependent thereon, were also rejected under 35 U.S.C. §103 on U.S. Patent 6,054,051 to van Reis and U.S. Patent 4,886,528 to Aaltonen, et al..

Apparatus claim 22 of the present application calls for a liquid separator in which the output passage (12) is formed to have a cross sectional area that increases toward the output end of the passage. While it is asserted, in the concluding sentence of paragraph 13 of the Office Action, that the van Reis reference also discloses this, this is clearly not the case. The figures of that patent, as well as Col. 6, lines 32-35, make it readily apparent that the cross sectional area of the output channel, identified by reference numeral 14, is uniform along its length and that conditions in the output channel are established and altered by controlling the operation of recirculating pump (46), the extraction pump (54), or the valve (56), and not by the geometry of the output channel.

There is thus no teaching or suggestion in the van Reis reference of the cross sectional area divergence feature recited in the apparatus of application claim 22.

The Aaltonen reference does not overcome the shortcoming of the van Reis reference in the above respect.

Independent apparatus claim 22, and the claims dependent thereon, are directed to subject matter patentable over this combination of references.

Apparatus Claims 24, et seq.

In the Office Action of September 26, 2006, independent apparatus claim 24 was rejected under 35 U.S.C. §102 as anticipated by U.S. Patent 3,929,003 to Llewellyn.

As noted above, the subject matter recited in the amended claims now present in this application differs from the detector in the Llewellyn reference in both purpose and construction. As noted at page 3, lines 31-34 and elsewhere in the application specification, the purpose of the present invention is to optimize gas throughput and minimize response times when carrying out separation on a sample gas having deleterious substances, such as moisture, entrained therein. The Llewellyn reference is directed to extracting trace gases from the waters of streams, rivers, lakes, and oceans.

Claim 24 has been amended to make it clear that the narrowing of the input passage takes place at the output end of that passage, as shown in Fig. 4 (solid lines) and Fig. 9 thereby to distinguish over the tapering noted in the concluding sentence of paragraph 6 of the Office Action.

Independent apparatus claim 24 thus describes subject matter that is neither anticipated or obvious in view of the disclosure of the Llewellyn reference.

Apparatus claim 24, and claims 11-13, dependent thereon, have been additionally rejected under 35 U.S.C. §103 on the van Reis and Aaltonen et al. references.

Claim 24 has been amended to describe the cross sectional area of the input end of the input passage as greater than the corresponding end of the output passage by an amount that causes the flow of gas along the tapered passages to generate similar gas velocity profiles in the passages. As noted at page 9, lines 1-9 of the application specification, with such a configuration, the transit time of all gas molecules in the separator is the same. This minimizes the delay occurring in the separator, as shown by the solid line in Fig. 4, so that, as noted in page 3, lines 31-34 of the application the response time of the gas analyzer is only minimally affected.

In the van Reis filtration system, the input ends of the two channels are shown as equal in dimension, not unequal as called for in amended claim 24.

Further, as described in amended claim 24, the gas velocity profiles in the passages are generated by the flow of the gas, itself, in conjunction with the varying geometry of a passage along its length. In van Reis the flow velocity in one of the passages is controlled by

pumps (46, 54) and a valve (56) and not by unaided gas flow and the configuration of the passage.

The subject matter now recited in claim 24 is thus clearly different than any teaching or suggestion of the van Reis reference. The Aaltonen et al. reference has been cited to show a particular type of separating material and it does not overcome the shortcomings of the van Reis reference with respect to the above described features. Claim 24 is deemed allowable over this combination of references. The same is true of dependent claims 11, 12, 13, and 25.

Method Claims 26, et seq.

In the Office Action of September 26, 2006, independent method claim 26 was rejected under 35 U.S.C. §103 on the van Reis and Aaltonen et al. references. No substantive rejection was made of dependent method claims 15 and 16.

Claim 26 has been amended to specifically note that it is one for separating a small quantity of liquid from a larger volume gas stream intermittently containing a quantity of gas of interest to be analyzed. Such a gas stream may comprise, for example, the expiratory gases of a patient containing CO₂ as the gas quantity of interest. The separation is carried out in a manner that minimizes alteration of the response time of the gas analyzer.

To this end, claim 26 calls for the step of providing a gas stream containing the small amount of liquid and the intermittently appearing gas of interest to be analyzed to the input end of an input passage. A major part of the gas stream passes through a separating wall to an output passage for supply to a gas analyzer. A minor part of the gas stream and the liquid remains behind in the output passage for discharge to a liquid trap. The flow of gas through the passages is such that, due to variations in the cross sections of the passages, the gas velocity profiles are similar in each of the passages so that the response time in the gas analyzer is minimally affected.

Claim 26 differs from the van Reis and Aaltonen references in the following respects. First, claim 26 calls for providing a gas stream having a small amount of liquid and an intermittently appearing gas quantity of interest to be analyzed to the input of an input passage. No such step is found in the applied references.

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Claim 26 also calls for passing the major portion of the gas stream across the separating wall from the input passage to the output passage. This stands in contrast to the teaching of main van Reis reference in which only a selected species traverses the filtration membrane, in order to concentrate the species, with the fluid mixture carrying the species being discharged from the inlet chamber.

Still further, claim 26 calls for using cross sectional variations in the input and output passages to establish similar gas velocity profiles in the passages. This provides a steep front to the intermittent gas quantity of interest contained in the gas stream so that alteration of the response time of the gas analyzer is minimized when the gas quantity is presented to the analyzer. As noted above, the van Reis reference describes using pumps (46, 54) and a valve (56) for controlling flow through one of the chambers.

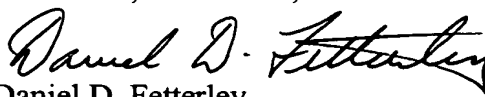
For the foregoing reasons, the van Reis reference, either alone or in combination with the Aaltonen reference, does not render the subject matter of amended claim 26 and the claim is deemed allowable.

Conclusion

Withdrawal of the rejection and passage of the application to allowance with claims 2-7, 11-13, and 15-27 is respectfully requested.

Respectfully submitted,

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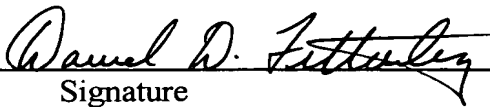
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